IS 5428-5 (1985): Specification for Gauge Glasses, Part 5: Port Gauge Glasses as Used in Fittings for Steam Boilers [MED 17: Chemical Engineering Plants and Related Equipment]

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(Reaffirmed 2006)

Indian Standard

SPECIFICATION FOR GAUGE GLASSES

PART 5 PORT GAUGE GLASSES AS USED IN FITTINGS FOR STEAM BOILERS

(First Revision)

1. Scope — Covers the requirements for port gauge glasses as used in fittings for steam boilers.

2. Definitions — For the definitions of various terms used in glass industry refer to **2** of IS : 5428 (Part 1)-1985 'Specification for gauge glasses: Part 1 Tubular glasses for level gauges (*first revision*)'.

3. Material — Port gauge glasses shall be made of toughened borosilicate glass.

3.1 Port gauge glasses shall be free from defects that could interfere with vision or service.

3.2 The following properties shall be decided between the purchaser and the manufacturer depending on working conditions and shall be specified along with requisitions:

a) Chemical resistance to water, acid and alkalis with some minimum limits;

b) Average co-efficient of thermal expansion;

c) Chemical composition of glass; and

d) Tensile and bending strength at ambient and maximum operating temperature.

4. Dimensions — Port gauge glasses shall be right cylinders within the tolerances specified.

4.1 The diameters of port gauge glasses shall be as agreed to between the purchaser and the manufacturer, but shall not exceed 52 mm for working gauge pressures up to 8 000 kPa nor 34 mm for working gauge pressures up to 20 600 kPa.

4.2 The thickness of port gauge glasses shall not be less than:

a) 12·0 for diameters up to 29 mm;

b) 12·6 mm for diameters over 29 mm and up to 32 mm;

c) 14·0 mm for diameters over 32 mm and up to 34 mm; and

d) 17·0 mm for diameters over 34 mm and up to 52 mm.

4.3 All sharp edges shall be uniformly bevelled at 45° around the periphery. The width of the bevels is a function of the design of the fitting and shall be the subject of agreement between the purchaser and the manufacturer.

5. Tolerances — Particular design requirements may necessitate manufacture to closer tolerances than those given in **5.1** to **5.3** in which case they shall be subjected to agreement between the purchaser and the manufacturer.

5.1 The diametral tolerances shall not exceed a total of 0·4 mm for diameters up to 34 mm nor a total of 0·8 mm for diameters over 34 mm and up to 52 mm.

5.2 The thickness tolerance, subjected to the additional limitations of **5.3**, shall be as follows:

a) For applications up to a working gauge pressure of 8 000 kPa, the total tolerance shall not exceed 0·25 mm; and

b) For applications above a working gauge pressure of 8 000 kPa and up to 20 600 kPa, the total tolerance shall not exceed 0·10 mm.

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5.3 The parallelism of surfaces shall be assessed by measuring the variation of thickness around the perimeter of a circle having a diameter 3 mm less than that of the glass. A minimum of 6 measurements shall be taken; variation in thickness in any one glass shall not exceed the following:

a) For applications up to a working gauge pressure of 8 000 kPa : 0·075 mm; and

b) For applications above a working gauge pressure of 8 000 kPa and up to 20 600 kPa : 0·025 mm.

6. Finish of Faces — The faces of port gauge glasses shall be polished; their edges may be smooth ground or as moulded.

7. Tests

7.1 *Dimension Check* — The port gauge glasses shall be checked for conforming to the specified dimensions.

7.2 *Inspection Under Polarized Light* — Each toughened port gauge glass shall be examined under polarized light. Any glass which does not show a polarization pattern indicative of toughening shall be rejected. Hoop stress, as seen by rotation of the glass in the strain viewer, shall not be interrupted by the presence of surface cracks heavy cord or other defects.

7.3 *Thermal Shock Requirements* — The manufacturer shall subject or cause to be subjected, toughened port gauge glasses to thermal shock test as described in **8.4** of IS : 5428 (Part 1)-1985*. Port gauge glasses, being small, shall be supported above the base of the oven while being heated. Individual wire frames, with the glass resting on its edges on two thin wires shall be used. After reaching the specified temperature, the glass shall be transported in the frame as quickly as possible to the quenching bath, but the glass only shall be dipped into the water. These small glasses may enter the water edges first.

The number of glasses so subjected shall be 2 percent of the consignment, but not less than 10 glasses, nor more than 30 glasses, selected at random.

A failure of a single glass shall cause the whole of the consignment to be rejected.

Glasses subject to and passing the test may be put into service.

7.4 *Hydrostatic Test* — The assembly shall be hydrotested at a minimum pressure of 1·5 × Operating pressure × Allowable stress of glass at ambient temperature/Allowable stress of glass at operating temperature.

8. Marking — The port gauge glasses shall be permanently marked with the following:

Manufacturer's identification or trade-mark.

8.1 *ISI Certification Marking* — Details available with the Indian Standards Institution.

9. Packing — The glasses shall be packed securely in suitable inner boxes, containing not more than 24 glasses and adequately cased for transit.

EXPLANATORY NOTE

This standard was originally published in 1969 in two parts. The present revision of the standards have been made as a result of further experience gained aud development in this field and has been brought out in five parts as follows:

Specification for gauge glasses: Part 1 Tubular glasses for level gauges [IS : 5428 (Part 1)-1985],

Specification for gauge glasses: Part 2 Protector glasses for tubular gauges [IS : 5428 (Part 2)-1985],

Specification for gauge glasses: Part 3 Through-vision and reflex glasses [IS : 5428 (Part 4)-1985],

Specification for gauge glasses: Part 4 Circular sight and light glasses [IS : 5428 (Part 4)-1985], and

Specification for gauge glasses: Part 5 Port gauge glasses as used in fittings for steam boilers [first revision of IS : 5428 (Part 5)-1985].

In the preparation of this standard assistance had been derived from BS 3463-1975 'Observation and gauge glasses' for pressure vessels issued by British Standards Institution.

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